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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/553,776	04/21/2000	Venugopal Srinivasan	28049/36451	6850

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EXAMINER	
ODOM, CURTIS B	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/553,776	SRINIVASAN, VENUGOPAL	
	Examiner	Art Unit	
	Curtis B. Odom	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-25,27-38,40 and 41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18-21,32-38,40 and 41* is/are allowed.

6)☒ Claim(s) *1-4, 6-17, 22-25, and 27-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-4, 6-25, 27-38, 40, and 41 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 6, 8, 11-14, 16, 22-25, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Der Vleuten et al. (previously cited in Office Action 2/8/2006) in view of Jensen et al. (U. S. Patent No. 6, 421, 445).

Regarding claim 1, Van Der Vleuten et al. discloses an encoder (Fig. 19) having an input and an output, wherein the input receives an audio signal, wherein the encoder calculates (column 14, line 56-column 15, line 21) an entropy (probability signal) of at least a portion of the signal and encodes the signal (column 7. lines 27-43 and column 16, lines 3-27) to insert an ancillary code (side information) representing the calculated entropy (column 24, lines 1-5,

probability signal) and wherein the output carries the encoded signal, which includes the ancillary code (column 24, lines 1-5).

Van Der Vleuten et al. does not disclose encoding to preserve an entropy of the encoded portion of the signal.

However, Jensen et al. discloses encoding an audio signal by assigning a unique set of code frequency components to each of the data states or symbols, so that during a signal interval, a corresponding data state is represented by the presence of its respective set of code frequency components (see column 8, lines 46-51). This technique preserves the encoded signal by reducing interference with the code detection by audio signal components (see column 8, lines 52-56). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the encoding of Van Der Vleuten et al. to implement the coding of Jensen et al. to preserve an entropy of the encoded signal by using a unique set of code frequency components which would allow for a large number of frequency code components of the encoded signal to be detected despite program audio signal detection interference (Jensen et al., see column 8, lines 52-56).

Regarding claim 2, which inherits the limitations of claim 1, Van Der Vleuten et al. discloses the signal is an audio signal (column 16, lines 55-65).

Regarding claim 3, which inherits the limitations of claim 1, Van Der Vleuten further discloses the encoder determines the entropy value based on a summation of probabilities (column 15, lines 38-43).

Regarding claim 4, Jensen et al. further discloses coding each data state (bit) of the audio signal by assigning a unique set of code frequency components to each data state (see column 4,

lines 46-52) and amplitude modulating the frequency components by assigning an amplitude to each code frequency components (see column 8, line 66-column 9, line 6). It would have been obvious to include this feature to reduce interference with the code detection by audio signal components (see Jensen et al, column 8, lines 52-56)

Regarding claim 6, Van Der Vleuten et al. discloses an encoder (Fig. 19) having an input and an output, wherein the input receives a signal, wherein the encoder calculates (column 14, line 56-column 15, line 21) an entropy (probability signal) of at least a portion of the signal and encodes the signal (column 7. lines 27-43 and column 16, lines 3-27) to insert an ancillary code (side information) representing the calculated entropy (column 24, lines 1-5, probability signal), wherein the entropy (probability) value is comprised of bits (column 7, lines 27-43) and wherein the output carries the encoded signal, which includes the side information (column 24, lines 1-5).

Van Der Vleuten et al. does not disclose encoding each bit of the entropy value to preserve an entropy of the encoded portion of the signal.

However, Jensen et al. discloses encoding an audio signal by assigning a unique set of code frequency components to each of the data states (bits) or symbols, so that during a signal interval, a corresponding data state is represented by the presence of its respective set of code frequency components (see column 8, lines 46-51). This technique preserves the encoded signal by reducing interference with the code detection by audio signal components (see column 8, lines 52-56). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the encoding of Van Der Vleuten et al. to implement the coding of Jensen et al. to preserve an entropy of the encoded signal by using a unique set of code frequency components for each data state (bit) which would allow for a large number of frequency code

components of the encoded signal to be detected despite program audio signal detection interference (Jensen et al., see column 8, lines 52-56).

Regarding claim 8, Jensen et al. further discloses encoding techniques such as frequency hopping can be used or combined with the disclosed coding technique to code the data states or symbols (see column 8, lines 59-65). Therefore, it would have been obvious to encode using frequency hopping of each data state combined with the disclosed encoding technique to reduce interference with the code detection by audio signal components (see Jensen et al, column 8, lines 52-56).

Regarding claim 11, Van der Vleuten et al. discloses a decoder (Fig. 20) having an input and an output, wherein the input receives an audio signal (column 15, line 44-column 16, line 14) , which includes an ancillary code (side information) representing an entropy value (column 24, lines 1-5) encoded in the signal, wherein the decoder decodes the signal to extract the ancillary code (column 25, lines 58-60) to read the entropy value (probability signal) from the signal and wherein the output carries a signal based upon the decoded entropy code (column 15, lines 44-55).

Van Der Vleuten et al. does not disclose the encoded signal includes encoding to preserve an entropy of the encoded portion of the signal.

However, Jensen et al. discloses encoding an audio signal by assigning a unique set of code frequency components to each of the data states or symbols, so that during a signal interval, a corresponding data state is represented by the presence of its respective set of code frequency components (see column 8, lines 46-51). This technique preserves the encoded signal by reducing interference with the code detection by audio signal components (see column 8, lines

52-56). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the encoding of Van Der Vleuten et al. to implement the coding of Jensen et al. to preserve an entropy of the encoded signal by using a unique set of code frequency components which would allow for a large number of frequency code components of the encoded signal to be detected despite program audio signal detection interference (Jensen et al., see column 8, lines 52-56).

Regarding claim 12, which inherits the limitations of claim 11, Van Der Vleuten et al. discloses the signal is an audio signal (column 16, lines 55-65).

Regarding claim 13, which inherits the limitations of claim 11, Van Der Vleuten et al. discloses the entropy (probability) value represents an entropy having a value based on a summation of probabilities (column 15, lines 38-43).

Regarding claim 14, Jensen et al. further discloses decoding the signal by amplitude demodulating the code frequency components by detecting a signal corresponding to the expected amplitude or amplitudes representing each code frequency component (see column 24, lines 48-60). It would have been obvious to include this feature to reduce interference with the code detection by audio signal components (see Jensen et al, column 8, lines 52-56)

Regarding claim 16, Jensen et al. further discloses encoding techniques such as frequency hopping can be used or combined with the disclosed coding/decoding technique to code/decode the data states or symbols (see column 8, lines 59-65). Therefore, it would have been obvious to encode/decode using frequency hopping of each data state combined with the disclosed encoding/decoding technique to reduce interference with the code detection by audio signal components (see Jensen et al, column 8, lines 52-56).

Regarding claim 22, the claimed method includes features corresponding to the above rejection of claim 1, which is applicable hereto.

Regarding claim 23, the claimed method includes features corresponding to the above rejection of claim 2, which is applicable hereto.

Regarding claim 24, the claimed method includes features corresponding to the above rejection of claim 3, which is applicable hereto.

Regarding claims 25 and 27, the claimed method includes features corresponding to the above rejection of claim 4, which is applicable hereto.

Regarding claim 29, the claimed method includes features corresponding to the above rejection of claim 8, which is applicable hereto.

4. Claims 7, 15, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Der Vleuten et al. (previously cited in Office Action 2/8/2006) in view of Jensen et al. (U. S. Patent No. 6, 421, 445) as applied to claims 1, 11, and 22, and in further view of Best et al. (U. S. Patent No. 5, 113, 437).

Van Der Vleuten et al. and Jensen et al do not disclose the encoding/decoding (modulate/demodulation) of the signal including the ancillary code (side information) is encoded/decoded (modulated/demodulated) by amplitude modulating/demodulating the signal at a pair of frequencies to preserve an entropy of the encoded portion of the signal by swapping a spectral amplitude of at least two frequencies in the signal.

However, Best et al. discloses encoding bits of an audio signal by generating pairs of frequency bands (see column 2, lines 59-64), wherein the bits of the audio signal are encoded by swapping the amplitudes of the frequencies for each bit, wherein bit 0 is encoded on the

amplitude (pulse) of the 2713 Hz frequency and bit 1 is encoded on the amplitude (pulse) of a 3228 Hz frequency (see column 3, lines 4-12). Best et al. further discloses decoding by detecting the code frequencies and extracting the data (see column 3, lines 42-60) Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the encoding/decoding of Van der Vleuten et al. and Jensen et al. with the encoding/decoding as disclosed by Best et al. since Best et al. states such encoding renders the code more difficult to audibly detect (see column 1, lines 65-68).

5. Claims 9, 17, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Der Vleuten et al. (previously cited in Office Action 2/8/2006) in view of Jensen et al. (U. S. Patent No. 6, 421, 445) as applied to claims 1, 11, and 22, and in further view of Scheirer et al. (U. S. Patent No. 6, 363, 175).

Regarding claims 9, 17, and 30, Van Der Vleuten et al. and Jensen et al. do not disclose encoding/decoding of the signal including the ancillary code (side information) is encode/decoded by spectral modulation.

However, Scheirer et al. discloses spectral encoding of information by mapping (modulating) a set of data to a number of spectral components (see Abstract). Data bits to be encoded are mapped to amplitude and phase modulators (see column 5, line 66-column 6, line 8). At a receiving the side, the spectral encoded data is decoded using known reference amplitudes and phase data to extract the encoded data (see column 5, line 53-65). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the encoding/decoding of the ancillary code (side information) and received signal of Van Der Vleuten et al. and Jensen et al. to implement spectral mapping (modulation) as disclosed by

Scheirer et al. since Scheirer et al. states this spectral mapping can realize much higher throughput per available bandwidth that conventional techniques employing binary baseband signals (see Abstract).

6. Claims 10 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Der Vleuten et al. (previously cited in Office Action 2/8/2006) in view of Jensen et al. (U. S. Patent No. 6, 421, 445) as applied to claims 1 and 22, in further view of in view Osawa previously cited in Office Action (9/30/2003).

Regarding claims 10 and 21, Van Der Vleuten et al. and Jensen et al. do not disclose disclose the entropy (probability) value of the ancillary code (side information) in calculated using histograms.

However, Osawa discloses calculating an entropy value used for encoding and decoding using histograms which allows for dynamic probability estimation (column 2, lines 59-67, column 6, lines 40-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the calculation method of Van Der Vleuten et al. and Jensen et al. with the teachings of Osawa and implement dynamic probability estimation using histograms since Osawa states that dynamic probability estimation improves coding efficiency (column 2, lines 59-67).

Allowable Subject Matter

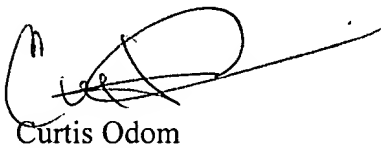
7. Claims 18-21, 32-38, 40, and 41 are allowable over prior art references because related references do not disclose comparing an entropy value in the signal with an entropy value determined at the decoder.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Curtis Odom
September 16, 2006